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SPECIAL ARTICLES

STUDIES ON THE STAINING REACTIONS OF BACTERIA
GERTRUDE DOWSLEY

HEALTH OFFICERS' ASSOCIATON OF ONTARIO PRESIDENT'S ADDRESS
DR. T. W. G. MCKAY

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A. B. CHANDLER, M.D.

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The Public Health Journal

Vol. XVIII. TORONTO, AUGUST, 1927 No. 8

Studies on the Staining Reactions of Bacteria

By Gertrude Dowsley
University of British Columbia
(Being thesis submitted in partial fulfilment of requirements for B.A. with honors in Dept. of Bacteriology, 1927).

A SERIES of experiments have been performed in order to determine the effect of certain factors on the reaction of bacteria with Gram's stain, methylene blue and aqueous fuchsin stains. The factors studied were: age, artificial killing by boiling, and the prolonged drying of the smear before staining. Definite relations were established in most cases between these factors and the Gram stain, and between the same factors and the methylene blue stain, but not between these factors and aqueous fuchsin stain.

Organisms representing different types were chosen, *Staphylococcus citreus*, *B. diphtheriae* D E[1], *B. diphtheriae* A C D[1], *Micrococcus flavus* and *Sarcina lutea*. All cultures were grown on standard nutrient agar at 37° C. Loeffler's blood serum was also used for *B. diphtheriae*.

Standard Nutrient agar

1.8 gms. beef extract
6 gms peptone
3 gms. salt
600 cc. water
9 gms. agar

Gram Stain Formula[2]
Gentian Violet
Solution I

methyl violet	2 gms.
aniline oil	9 gms.
absolute alcohol	33 gms.

Solution II

Saturated aqueous solution of methyl violet 1 part of solution i and 9 parts of solution ii.

[1]Wesbrook's Classification.
[2]Mallory & Wright.

Gram's Iodine

1 gm. iodine
2 gms. potassium iodide
300 cc. water

Method

A thin smear was air-dried and fixed by passing through the flame; flooded with gentian violet for 1 minute; washed; flooded with Gram's Iodine for 2 minutes; washed; and decolorized in 95% alcohol for 1 minute; washed and counterstained with aqueous fuchsin for 1 minute; washed; and blotted dry.

Loeffler's Methylene Blue
Formula

30 cc. saturated alcoholic solution
100 cc. water
1 cc. 1% potassium hydroxide

Method

A thin smear was air-dried and fixed by passing through the flame, then flooded with methylene blue solution for 1 minute; washed and blotted dry.

Aqueous Fuchsin
Formula

5 cc. saturated alcoholic solution
100 cc. water

Method

The smear was air-dried and fixed by passing through the flame; then flooded with aqueous fuchsin solution for 1 minute; washed and blotted dry.

A stop watch was used for timing the exposure of the slides to the various solutions.

The smears were examined under a binocular oil immersion lens using a white light derived from a 100 w. internally frosted electric bulb. This was found to be the most satisfactory method, since daylight varies from day to day with sunny weather, cloudiness and rain, and therefore the appearance of the field is not constant.

Experimental Observations of the Effect of Age on Cultures

After some preliminary work to develop the details of the technique and to establish the general trend of the reactions the following representative results were obtained.

Table 1 shows that on all but one species the age of the culture has a marked effect on the reaction of Gram positive organisms to the Gram stain. The period which must elapse before this factor begins to affect the reaction varies with the individual species and the media on which it is grown.

S. citreus represents the type of Gram positive organisms which may be relied upon to remain Gram positive. In this case *S. citreus* remained Gram positive through a period of 5 weeks growth on standard nutrient agar. Although a very few Gram negative cocci were present at some stages their proportion did not increase, and at the end of the experiment the fields examined appeared entirely Gram positive.

The other organisms represent the type sometimes known as Gram amphophile organisms[1] whose reaction to the Gram stain varies under different conditions. *B. diphtheriae* DE, when grown on nutrient agar, was Gram positive for 48 hours and then rapidly became negative until after two weeks' growth it was completely decolorized by the alcohol. This organism was grown on Loeffler's serum and when examined showed the characteristic granules. Although a few Gram negative organisms appeared in the field, even at 4 hours' growth, their number did not increase nearly as rapidly as when the same species was grown on nutrient agar. When the culture was 4 weeks old about one-fourth of the diphtheria bacilli were still Gram positive, after which the serum was too dried to provide smears. The granules retained the stain longer than the rest of the rod.

The effect of age on *M. flavus* and *S. lutea* becomes evident in a different manner. Instead of the proportion of Gram negative to Gram positive organisms increasing from day to day as in the case of *B. diphtheriae*, the portion of each organism which retains the stain gradually becomes less and less, the central part holding it the longest; at the same time more of the counter stain affects the organism, giving various degrees of colour from dark blue, through reddish purple, to red. Comparison of smears stained by the regular Gram method with others stained by Gram's method omitting the aqueous fuchsin makes this result apparent, *i.e.*, leaving the negative portion unstained.

The effect of age on staining with Loeffler's methylene blue corresponds to that with the Gram stain; in that Loeffler's methylene blue

[1]Victor Burke, Journal of Bacteriology, 7: 159.

has no power to stain very old cultures. However, the proportions of organisms unstained is not as definite as with the Gram stain. Fresh cultures stain a deep blue; this changes to an uneven light blue, then to a pale blue and finally to a very faint blue as the age increases.

Aqueous fuchsin stains both old and young cultures the same. Although there is no decrease in intensity of the stain for the same species some species at all times take a much more brilliant shade of red than others. *S. citreus* stained a bright red throughout the 5 week period, while *B. diphtheriae*, when grown on agar, stained a medium red throughout, but when grown on serum the rod stained the same medium red while the granules took a deep bright red. *M. flavus* and *S. lutea* both stained at all times a bright red similar to *S. citreus*.

Experimental Observations of the Effect of Artificial Killing by Boiling

The growth from 24-hour cultures of each organism was transferred by the inoculating needle to tubes containing about 3 cc. of sterile water. Smears were made from these suspensions. Streaks on nutrient agar slants from these suspensions showed characteristic growth after incubation at 37° C. for 24 hours. The tubes containing the water suspensions were then placed in a water-bath at 37° C. and brought to the boiling point in 4 minutes. These were removed from the water-bath and smears made of each. Streaks on nutrient agar slants from these heated suspensions showed no growth after incubation, the organisms having been killed. The water suspensions were placed again in the boiling water for one minute, then removed and smears made. This procedure was also repeated after periods of boiling for 5 minutes and again after 10 minutes. All smears were stained by Gram's method, Gram's method minus aqueous fuchsin, Loeffler's methlyene blue, and aqueous fuchsin.

S. citreus and *M. flavus* stained practically the same boiling as before with all methods of staining (Table 2).

B. diphtheriae DE from a culture grown on standard nutrient agar stained Gram positive before boiling and Gram negative after bringing to the boiling point, only a few organisms remaining Gram positive. Methylene blue stained this organism dark blue before boiling, a light blue after bringing to the boiling point and very faintly after prolonged boiling. Aqueous fuchsin stained equally well before and after boiling.

The suspension from a 24-hour culture of *B. diphtheriae* ACD grown on serum stained Gram negative with Gram positive granules. After killing, by bringing to the boiling point, nearly all the granules failed to

retain the Gram stain. When stained with methylene blue, before boiling the rod stained a light blue and the granules a dark blue. After boiling the granules stained less deeply; and after boiling 15 minutes only a very few granules stained dark blue. With aqueous fuchsin no difference was apparent before and after boiling; the rod stained a light red and the granules a deep, bright red.

The suspension of *S. lutea* stained Gram positive before boiling with about 1/10 of the field Gram negative. After bringing to the boiling point about ½ of the field was Gram negative. When the counter stain was omitted from the Gram staining method the smear showed that about one-half of the cocci were completely stained by the gentian violet. The other half were partly decolorized, the centre of each organism retaining the most stain. These are probably the organisms which are affected by the counter stain—aqueous fuchsin—in the regular Gram method. Methylene blue stained *S. lutea* almost as well after boiling for 15 minutes as before. Aqueous fuchsin showed no difference in its staining powers before or after boiling.

Effect of Prolonged Drying of Smear before Staining

Water suspensions of the organisms were made by transferring the growth from 24-hour slant cultures to tubes containing about 3 cc. of sterile water. Smears were made from these on 2 sets of slides (4 slides in each). The suspensions were then boiled for 15 minutes and smears again made on each set of slides. The first set was fixed by passing through the flame; one smear was then stained by Gram's method; one by Gram's method omitting aqueous fuchsin; one by Loeffler's methylene blue; and one by aqueous fuchsin. The second set was allowed to dry on the slide for 4 weeks; they were then stained by the same methods.

In each species, except *M. flavus*, the organisms stained almost the same after the drying as when stained fresh (Table 3). *M. flavus* was Gram positive when stained fresh but was almost entirely Gram negative after drying. A few Gram negative organisms were present in the smear of Set 1 after boiling but after the subsequent drying the field was completely Gram negative. The same result was shown when the smear was stained with Gram's stain omitting the aqueous fuchsin, and again with Loeffler's methylene blue, but with aqueous fuchsin the smears were stained the same in both sets.

The smears from suspensions of *S. citreus*, *B. diphtheriae* ACD and *S. lutea* showed Gram positive when stained fresh and were also Gram positive after the drying. Boiling changed *B. diphtheriae* and *S. lutea* to Gram negative; the subsequent drying made no further marked

change. Boiling caused *M. flavus* to show a few Gram negative organisms; the subsequent drying made the whole field Gram negative. Gram's method omitting aqueous fuchsin, and the methylene blue stains corresponded in affect to the regular Gram stain, while aqueous fuchsin stained the same throughout.

In the above experiments with the Gram stain 95% alcohol was used as the decolorizer and left on the slide for 1 minute, after which no more blue colour came out. Absolute acetone was used for decolorizing in another series (Table 4). When left on 30 seconds it decolorized much more rapidly and also took the stain from some organisms which appeared Gram positive with the alcohol. Leaving the acetone on for 60 seconds did not increase the number of organisms decolorized. Amyl alcohol was also tried but failed to decolorize even Gram negative organisms satisfactorily.

The frequent irregularities and fluctuations in the accompanying tables and graphs are probably due to slight variations in staining methods or general technique, although great care was taken to avoid such experimental errors by the use of fresh staining solutions, accurate timing of the exposure to each solution, and by constant conditions of growth. However, the results may be taken to indicate the general trend of the staining reactions of the various species and the effect of certain factors on these reactions.

Discussion

To explain the staining reactions of bacterial cells we may adopt the mechanism used in Ehrlich's side-chain theory,[1] and it may therefore be assumed that the molecules of the stain combine with a certain side-chain of the bacterial protein molecule. This side-chain of some Gram positive organisms, such as *S. citreus*, is stable and not destroyed or lost when the organism dies or is killed; so that the reaction to the stain is the same at all times. The side-chain of other Gram positive organisms is not so stable. When these organisms die, or are killed, this side-chain is lost, and so the dye is unable to combine with the protein molecule and the reaction is prevented. These two groups of Gram positive bacteria have been distinguished as "stable" and "unstable" by Churchman,[2] and the latter classed as Gram "amphophile" organisms by Burke.[3]

Since aqueous fuchsin stained the organisms equally well at all times this stain must combine with a stable side-chain different in

[1]Kolmer, Infection, Immunity and Serum Therapy, pp. 135-145.
[2]J. W. Churchman, Stain Technology, Jan., 1927.
[3]Victor Burke, Journal of Bacteriology.

chemical structure from the side-chain with which the molecule of the Gram stain or methylene blue combines, since it is not destroyed when the organism dies or is killed. A practical application of this power of aqueous fuchsin to stain cultures at all times has been used by Hill[1] to identify old, dead cultures of *B. diphtheriae*. Under these conditions it is impossible to stain the organism by the Gram stain or Loeffler's methylene blue, but if aqueous fuchsin is applied the rod with its granules shows up distinctly.

The fact that drying influenced the staining reaction of *M. flavus* only may be because this organism was killed, the others remaining alive throughout the 4-week period. Therefore, the side-chain of *M. flavus* was destroyed, while side-chains of the other organisms were not. It is probable that even if *S. citreus* had been killed by the drying that no noticeable change would have occurred in the staining reaction, since in the other experiments the side-chain of this organism appears to be quite stable.

Further evidence that it was the side-chain of the organism which was destroyed, in some species, has been demonstrated in the following experiment.

The alcoholic and acetone solutions in which the smears were decolorized were kept, and partially evaporated to increase the concentration of the stain, and then used in staining smears from a fresh culture of *B. diphtheriae*. Since the slides were washed between the applications of the stains and the decolorizers the stain contained in these solutions was not excess stain left on the slide, but must have come from within the dead germs.

(*a*) A smear from a 24-hour culture of *B. diphtheriae* was flooded with the extracted acetone solution for 4 minutes, washed, and decolorized with alcohol.

The smear retained no stain.

(*b*) A similar smear was flooded with the extracted acetone solution for 4 minutes, washed, flooded with iodine solution for 2 minutes, washed and decolorized with alcohol. When examined the rods were found to be stained a bluish grey and the granules a dark blue or black, as in the regular Gram method. Therefore, the extracted acetone solution may be substituted for the gentian violet solution, but the iodine solution is required to fix the stain. That is to say, the iodine solution held the side-chains of the cells and those of the stain together, so that they were not split apart by the decolorizer.

The extracted alcoholic solution, when used in the same way, failed to stain similar smears. This may be because the alcohol acts differently

[1]H. W. Hill, by private communication.

from the acetone in extracting the stain or due to some action of the alcohol in the gentian violet solution.

It is evident from these experiments that the stain which does not react with the organism fails to do so, not because of any change in the stain, but because the side-chain of the germ has been destroyed or lost, and that this same stain still has the power to combine with an organism having its side-chain intact.

Conclusions

1. The reaction to the Gram stain of true Gram positive organisms, represented by *S. citreus*, was not affected by the age of the culture, artificial killing by boiling or prolonged drying of the smear before staining.

2. The Gram "amphophile" organisms, represented by *B. diphtheriae*, *M. flavus* and *S. lutea*, were markedly affected by the age of the culture and by boiling. The prolonged drying affected only one of this type—*M. flavus*—the others were probably still alive after the 4-weeks' period of drying.

3. The staining reaction with Loeffler's methylene blue corresponds closely to the reaction with Gram stain, the living and dead bacteria of certain species being differentiated by both stains.

4. Living and dead cultures were stained equally well by aqueous fuchsin. No relation was found between this stain and the Gram stain or Loeffler's methylene blue.

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TABLE 1

EFFECT OF AGE

Gram stain	24 hr.	2 day	4 day	6 day	8 day	10 day	13 day	2 wk.	3 wk.	4 wk.	5 wk.
S. citreus	0	0	0	0	1	1	1	1	1	0	0
B. diph. (agar)	0	0	6	7	7	7	7	8	8	8	8
B. diph. (serum)	1	1	2	2	4	3	4	4	6		
M. flavus	1	1	1	1	2	7	8	8	8	8	8
S. lutea	0	0	0	1	7	6	7	8	8	8	8
Methylene blue											
S. citreus	0	0	0	0	0	0	0	0	0	0	0
B. diph. (agar)	0	0	3	4	7	8	8	8	8	8	8
B. diph. (serum)	0	0	3	4	5	6	5	5	6		
M. flavus	2	2	1	1	2	4	4	2	4	2	5
S. lutea	0	1	0	0	0	2	0	0	0	0	8
Aqueous fuchsin											
S. citreus	0	0	0	0	0	0	0	0	0	0	0
B. diph. (agar)	0	0	0	0	0	0	0	0	0	0	0
B. diph. (serum)	0	0	0	0	0	0	0	0	0	0	0
M. flavus	1	1	1	1	1	1	1	1	3	1	1
S. lutea	0	0	0	0	1	0	0	0	0	0	0
Gram stain minus aqueous fuchsin											
M. flavus	1	1	1	1	2	7	7	8	8	8	8
S. lutea	0	1	3	4	4	5	6	7	6	8	8

0 = field completely stained
1 = $\frac{1}{8}$ stained
2 = $\frac{1}{4}$ stained
3 = $\frac{3}{8}$ stained
4 = $\frac{1}{2}$ stained
5 = $\frac{5}{8}$ stained
6 = $\frac{3}{4}$ stained
7 = $\frac{7}{8}$ stained
8 = field completely unstained

TABLE 2

EFFECT OF BOILING

	Before boiling	To Boil	Boiled 1 min.	Boiled 5 min.	Boiled 15 min.
Gram stain					
S. citreus	1	1	1	1	1
B. diph. (agar)	1	7	7	7	7
B. diph. (serum)	1	7	7	8	7
M. flavus	1	2	1	1	2
S. lutea	1	3	7	7	8
Gram stain minus aqueous fuchsin					
S. citreus	0	0	0	0	0
B. diph. (agar)	1	7	6	6	7
B. diph. (serum)	1	7	7	7	7
M. flavus	1	2	1	1	2
S. lutea	1	4	4	8	7
Methylene blue					
S. citreus	0	0	0	0	0
B. diph. (agar)	0	0	0	0	7
B. diph. (serum)	0	4	4	4	7
M. flavus	2	1	1	1	2
S. lutea	1	0	0	0	1
Aqueous fuchsin					
S. citreus	0	0	0	0	0
B. diph. (agar)	0	0	0	0	0
B. diph. (serum)	0	0	0	0	0
M. flavus	1	1	1	1	1
S. lutea	0	0	0	0	0

TABLE 3

EFFECT OF PROLONGED DRYING

	Set 1 Fresh	Set 2 Dried 4 wks.	Boiled 15 mins. Set 1 Fresh	Boiled 15 mins. Set 2 Dried 4 wks.
Gram stain				
S. citreus	1	1	1	1
M. flavus	1	7	2	8
B. diph. (agar)	1	1	7	8
B. diph. (serum)	0	1	7	8
S. lutea	1	1	8	7
Gram stain minus aqueous fuchsin				
S. citreus	1	1	0	1
M. flavus	1	7	2	7
B. diph. (agar)	1	1	7	8
B. diph. (serum)	0	1	7	8
S. lutea	1	3	7	7
Methylene blue				
S. citreus	0	0	0	0
M. flavus	2	1	2	1
B. diph. (agar)	0	1	7	4
B. diph. (serum)	1	1	7	7
S. lutea	1	0	1	1
Aqueous fuchsin				
S. citreus	0	0	0	0
M. flavus	1	1	1	1
B. diph. (agar)	0	0	0	0
B. diph. (serum)	0	0	0	0
S. lutea	0	0	0	0

TABLE 4

EFFECT OF DECOLORIZERS

	4 hr.	1 dy.	2 dy.	3 dy.	5 dy.	6 dy.	7 dy.	8 dy.	9 dy.	10 dy.	12 dy.	13 dy.	2 wk.	3 wk.	4 wk.	5 wk.
Gram stain																
With alcohol																
S. citreus	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0
B. diph. (agar)	0	0	0	6	7	7	6	7	7	7	7	7	8	8	8	8
B. diph. (serum)	1	1	1	2	2	2	3	4	4	3	4	4	4	6		
Gram stain with acetone 30 secs.																
S. citreus	1	0	1	1	1	1	1	1	1	2	1	1	1	2		
B. diph. (agar)	3	7	7	7	7	7	7	7	7	7	7	7	7	8		
B. diph. (serum)	3	7	7	6	4	7	7	7	6	4	4	4	7			
Gram stain with acetone 60 secs.																
S. citreus	1	0	1	1	1	0	2	1	2	1	1	1	1	2		
B. diph. (agar)	3	7	7	7	7	7	7	7	7	7	7	7	8	8		
B. diph. (serum)	4	6	7	4	4	6	6	3	6	4	4	4	5			

Health Officers' Association of Ontario President's Address

Dr. T. W. G. McKay

IF one were asked what is the real aim behind the Public Health Movement he might be considered to have answered the question completely if he said:

"The establishment of, the maintenance of, and the reconstitution to fulness of citizenship."

Such a definition of the aim of Public Health entails prevention, protection, and the usage of all the fields of practice of what is known as General Medicine.

The protection of the public against disease and its consequences is directly bound up in the interaction and relationships between the different members of those prime social elements which are known to us as:

> The general public, doctors, nurses, and all those organizations through which they find expression, the State and its Government, municipalities and their executives, hospitals and their staffs, social and health services of all kinds, and, above all others, the home, the dwellers therein, and their integrities.

Individually, many of these elements have an intensive development and detail of organization. Collectively, their inter-relationships are not always of the happiest nor of the wisest and best, nor, more particularly, wisely co-ordinated.

Herein lie many of the difficulties which public health effort encounters.

Perhaps, at the present time, one would show wisdom in surveying the whole field of prevention in a casual way, and offering such necessary comment, here and there, as occasion offers. It might be useful, as well as advantageous, to look upon prevention as an interlocked chain of activities and their results. I desire to present to you some observations, based on my personal experiences, on some incomplete links, or links as yet unforged in this chain of prevention, and as these have presented themselves before me.

Link 1

Outstanding, above all other failures of co-ordinated relationships, so far as the general public is concerned, is that very evident and common

failure to apprize at its real and proper valuation Human Life, as well as to instil properly into, and fix, in the minds of all of us that definite realization of value.

The startling figures given by Dr. Louis Dublin, as to the value of Human Life, are an all-sufficient proof of this. How many are there, in any hundred of us, who act, day by day, as if they knew that a newborn babe, in a family living on an income of $2,500.00, has a potential value to that family of $9,333.00? That the eighteen year old adolescent is said to have a value of $29,000.00? That at twenty-five years the valuation increases to $32,000.00? How best may we make such a computation common knowledge? By what means may the application of such figures be made to the value losses of lives sacrificed in disaster, in epidemic or cataclysmic destruction? How may we bring home to the slumbering minds of citizens the value of just one Human Life? How can a community be made to appreciate the life loss, the monetary loss, due to occurrences such as Montreal's recent Typhoid Fever situation? How can such figures be made impressive enough to appeal to that nebulous thing, the Civic Conscience, and thus prevent, forever, any recurrence, in this Canada of ours, of any comparable conditions of disaster to society?

Of this epidemic alone statistical evidence given states that since March 4, 1927, there have been reported over 4,250 cases of typhoid fever (in March 1,812, in April 791, in May 1,656), and it is said also there have followed over 289 deaths (in May there being 107). Since May 1, then, there have been reported, in slightly over one month's time, more than one-half of the total number of cases previously reported from March 4 to April 30. Add to the valuation computed on Human Life, the additional cost of hospital care, medical attendance, upkeep of homes, nursing care, interference with industry, with employment, and the statement of necessary wages lost (perhaps also we should include testamentary expense), and at last we may realize the terrific economic punishment which has been inflicted upon this community through the presence inside of its borders of a communicable and preventable disease —a disease concerning which, some long time ago, some one has said: "For every case of typhoid fever which occurs some one should be hung."

What a time they would be having of it now in Montreal!

Our ideals of life, and of living, our purposes of doing, our knowledge of disease, our sense of justice, our realization of values, need to be thought over, need, through better education, to be forged into new links and better welded. Perhaps, also, we need new acceptances of community responsibility, of individual obligation, for the care and welfare of others.

Link 2

Does the professional man or woman feel, because of his or her special training, any greater sense than the ordinary citizen of his or her responsibility?

"I love old ways, and the path I was walking felt kindly to the feet it had known for almost 50 years." So, in an essay, "On a strange condescension in foreigners," speaks James Russell Lowell in "My Study Windows."

One wonders, was it alone an atmosphere of age and of beauty which so appealed, or might it be rather ingrained precept and training as a Doctor of Medicine which tinctured his retrospective complacency?

Perhaps he but voiced the common mental attitude of all humanity once it has topped the rise of life and sees evening shadows gather.

Not so very long ago Sir Bertram Windle, with a different perspective of vision, made the statement: "Youth is the time of Idealism, before bound fast to Tradition."

To what extent do these two perspectives explain the varying values placed by different people on our present day Health Movement and to those endeavours concisely described in the slogan "Improvement of Health, Prevention of Disease, Mitigation of Suffering?"

Quite recently Dr. Henry F. Vaughan, Health Commissioner of the City of Detroit, is reported to have said: "The general practitioner of medicine is too frequently slow in keeping abreast with the advancement of preventive medicine." . . . "There is great danger that the enlightenment of the laity will outdistance the physician's own advancement." . . . "There is, however, one certainty, millions of people have been taught good medicine." . . . And here he is referring, particularly, to educative campaigns, public lectures, printed matter, and otherwise.

If he were speaking from conviction, after due consideration and reflection over the problems of the Public Health Programmes as they exist to-day among his fellow citizens, our neighbours to the south, then one is surely entitled to ask why and how have such conditions arisen.

Can it be possible that the educational standards for the courses of training in the Medical Schools of his country are in any way associated with these conditions? Are there any understandable causes and ascertainable reasons which, after being sought out, would be removable? If there are, would it not be worth while, also, to give consideration, to some extent, to our own didactic methods and practical training?

Dr. Vaughan himself suggests:

"The ultimate goal should be a community with sufficient

enlightenment and a medical profession so well trained in preventive medicine that there remains little for the health officer to do. For ultimate success we must make a health officer of virtually every practitioner."

This is some large order. It is not likely that Sir Thomas More would ever have dreamed of such an Utopia.

If such condition ever should arise it will most likely be when every school child has had its Junior Red Cross Training, has absorbed its precepts and by daily repeated practice of their teaching become a creature of automatic habit.

A far cry as yet! A result obtainable only after Junior Red Cross has become accepted by the Department of Education and is part of the curriculum of primary training in all our schools.

How much of truth is there in the suggestion that the practitioner of medicine of to-day is lacking, in general health matters, in the zeal of the true Crusader; that he needs a very definite reorientation through his academic training to his field of effort, to the public he serves, as well as to that deeply interested and quietly observing populace whose guardian of health he should be required to become?

How are we to reach such a goal?

The course in medicine is of an intensive and analytic character. The present day student in medicine is, by the very nature of that course, from its beginning up to the day of his graduation, and on through his hospital internship, even up to the final girding of his loins for his battles with disease, so overwhelmed by the inexorably accumulating array of facts (oftentimes imperfectly co-ordinated) day by day displayed before him that he finds too little opportunity for the study of the schematic end, and what is of far more importance, for the preparing of himself, adequately, for the pursuit of the Holy Grail, now so freely offered to those so gifted as to be able to view the fields of medicine from the top of the Eternal Hills and with a proper Vision of Service.

Medicine, as a body of knowledge, is made up of facts belonging in the fields of many Sciences, and it becomes necessary that all those factors and principles which are held by these various Sciences in common should be disclosed, formulated, and used consciously to that end.

Reason insists there is a necessity of securing a broad aspect of approach to the study of human ills. Experience shows also there is required a special attitude of mind on the part of the student and the practitioner, which takes time to develop. There is need for a complete survey of the age history of Human Life, its trials and its tribulations, its altering reaction through illness, through the space of years, in order that one may acquire for disease and its complications a wholesome understanding and respect.

We have long gone past that interpretation of disease, which considered it, in its primary sense, as a lack of comfort or well-being. Yet, out of the necessity for relief for such conditions, arose the Medicine Man, the Healer, and the earlier Physician. It is important to remember that harmful conditions often occur without giving rise to any previous subjective symptoms, and yet the whole strategy of successful care may depend, absolutely, on the early ascertaining of such conditions.

One has to give consideration to so many things before judgments and determinations may be made. Historical records, racial habits, tribal customs, family relationships, personal characteristics, the elemental dfferences of sex, chronological age, climate, season, environment, food supply, occupation, leisure, and a whole host of other influencing factors have to be studied, lest erroneous judgments be made and a warped perspective of disease be established.

At what time in a student career does the Medical Man digress from the formal paths of stereotyped teaching of individual subjects and catalogued disease, to wander in those other fields of co-ordinated thought, where he commences to visualize, for himself, that atmosphere of interwoven relations and associated social rehabilitations that surround each and all of us and disease as well, like an aura or the Halo of the Blessed?

Is one wrong in admitting that this occurs, perhaps, never, and often only after several years of active practice and observation of humanity in that great Post-Graduate School Experience?

Could any misfortune befall Scientific Medicine if the curriculum of Medical Studies should be somewhat rearranged so that, in part at least, the general concept of history of disease and of medicine, of social aspect and state relationship, were to become implanted in the fallow mind of the student of medicine in his primary years of his medical course, or as part of his training in Belles-Lettres and the Humanities?

In this manner historical survey of disease, history of medicine, social psychology and welfare, the development of preventive medicine, community hygiene and sanitation, industrial medicine and public health in the abstract, could be given a general survey and a broad interpretation in those earlier years of the medical course, becoming thus a practical illustration and description of all those problems and their solutions, continuously arising in the growth of nations and their communities, as, from time to time, they have become associated with conditions of illness and disease and their consequences, as they have afflicted man from his earliest times.

Such an introductory course of lectures could, in the later years of College training, be supplemented by those more precise and extensive

courses specially adapted to complete all the other necessary requirements in the programme of Medical Education.

Surely, out of all the mass of information and of literature, relative to the different subjects in the Medical curriculum that has accumulated over the past quarter century or more, there is now available enough material of historical accuracy, of breadth of thought, of sound philosophy, of scientific worth, and, what is by no means least, dipped from "Shakespear's Well of Pure English, undefiled," to make such course practical and valuable.

Through some such training, may it not reasonably be hoped, the student would obtain that right perspective to life and to his profession, so devoutly to be wished for, as well as a proper setting of relationship with his fellow-citizens and the State.

It has been feared by some, that because of the intensive period of industrialism and present commercialism, there exists an ever-present danger of forgetfulness and neglect of the humanities, that there is a present tendency to replace the amenities of life and social happiness by human frivolities and social unrest. If such be true there is a great danger also of mark-time of effort, of relaxation of vigilance, of stagnation of growth, in those better impulses of the mind, looking to the protection of humanity. If it is bad business to await disease, it is also good business and good medicine to apply the spirit of prevention.

Are there not here opportunities for the forging of new links in the chain of prevention?

Link 8

Wherein can the hospital be brought closer and bound tighter in the chain of prevention?

The present-day hospital, with all its perfection of structure, repleteness of equipment, adaptation of scientific knowledge to the care and treatment of disease, is still more or less isolated or standing aloof from the public it was intended to serve. Many of the modern hospitals, though giving a group service of a very valuable kind, as isolated parts of the chain of protection, have yet to forge and weld tight links of that chain which more intimately would bind them to prevention.

Is it too early yet to hope that a time approaches when complete physical and health examinations with an accompanying suggestion for guidance of future health care, as well as for treatment of disease, will be part of the functions of outdoor departments in the service of every hospital receiving Government Aid, or authorized by Government to carry on, and that these services will be available to each and all, with due regard to ability to pay, in full, or in part, as circumstances will allow, as well as to the indigent and the municipal order patients?

Is not the time now ripe for closer affiliation between Municipal Health and Hospital Services and Clinics, or what you will, in order that these may profit each by the other's work and special services, so as to avoid costly overlapping of effort and still, more especially, that the general public of the community which each professes to serve, may reap the fulness of benefit of such combined services?

The hospitals should enter more into the life of the public. They are in ever-increasing need of the general public and its good-will. The public is looking to the hospitals and their staffs for this greater field of service.

Our laws, our customs, our daily habits of life, our work effort, are founded, all of them, on an acceptance of physical health, of ability to serve, as well as to survive the struggle for existence. Disease, the great leveller, is entirely another matter. It is like unto a State within a State, where ordinary conventions fail, where helplessness and dependence, like unto that of infancy return. The State has acknowledged its duty, in the ultimate resort, to be prepared to care for its citizens, be they rich or poor. It should also assume its obligation to its other citizens, its sick, its older children.

As to how this solution will come, State Medicine, or otherwise, so far as Canada is concerned, determinations have yet to be made. Workmen's Compensation, Mothers' Allowance, Old Age Pensions, Superannuation Funds, are blazing the way of advance. Public and Private Alms, Municipal Relief, the House of Refuge, the Common Jail as a home for the aged and indigent, are steadily fading into the background. Understanding and sympathy now hold the day.

Link 4

What closer affiliation or what new links in the chain of prevention may we expect from professional nursing?

Perhaps, of all the links of protection, the ones just now most subject to trial, and looking for reinforcement, or their replacement by links yet unforged, are those links related to the provision of adequate nursing care for all sorts and conditions of people in their various kinds of illnesses and distress and under such widely varying conditions of social environment. Even when forged these new links may be the most difficult to insert and the hardest to close.

Trained nursing has reached out so rapidly, these past few years, and has attained its fulness of growth and professional standing so recently that it is but now commencing to overlook the demands of individualism, to bury jealousies and think collectively for the benefit of society in general and as a whole. Much as it affects medicine, hospitals, doctors, and the private patient, it belongs in a still much greater

degree to the people, their homes and their community, and presents to-day the greatest problem, in fact, a multitude of problems, for solution that remains to be attacked in the whole field of protective and preventive medicine: that is, an adequate provision of nursing care, of help in the home, of surveillance of the families, distraught with illness, for all grades for society. One grade of service only and that the best. Perhaps, though we hesitate to believe let alone acknowledge it, the community is, of all things, that one most definitely concerned with nursing aid, and its citizens, the persons most intimately concerned in a wise solution of all the problems associated with the securing of proper aid and comfort to the sick and, in the times of suffering and distress, of help to the well.

Private duty, Institutional activity, Hospital, Office, Industrial, District, School, Public Health, Visiting Nursing, Red Cross Aid, Neighbourhood Helpers, these are all some of the many fields over which nursing, in the best sense of the meaning of that word, has spread. All these have definite and set duties to perform,definite understandings as to work to be done, necessary charges to be made, and other returns to be received for services rendered. The community and the State are observing these with the utmost solicitude and with high hope of what the future holds in store. Massage, Occupational Therapy, Psychiatric Nursing, Reconstitutional Service, Invalid and Experienced Helper care, may all reasonably be looked upon as special branches of a Nurse's Calling, in a state of present flux, yet to be subjected to many changes, and to be looked upon rather as efforts of expression of the art of the Calling than of exhibitions of Ideals of Service.

Nursing, as yet, has but found itself and proven its right to exist. It has realized its obligation unto itself, rather than to the patient, sufficiently enough to put restriction on its hours of labour and to demand sufficient time for rest and recreation. By so doing it has shown it has something to give that is worth while and has value and that it is proud to be possessed of. It is only now commencing to realize that because it has something to give, and that worth while, it is necessary to seek out and find the object which requires to be served and needs the gift of its service. It has obtained the dignity of a profession and is no longer simply a Calling. There awaits it a great field of service to the community at large, to the humbler but honourable citizens, as well as to the poor and the rich, for the benefit of the State. Its service is needed to be given, not only full-time but in part-time service to those in need, at rates commensurate to their power to pay, and at a minimum of expenditure, in order that they may maintain a modicum of pride and their self-respect, rather than be forced to accept that for which, no matter how willing, they are really unable to offer a due reward for

service. One must never forget that the budget for the household of the sick, or the invalid, cannot be applied to that of the household of the well.

All signs seem now to be pointing to the wisdom of the acceptance of co-operation of effort under a general control, through a pooling of resources with definite organization, so that groups of nurses and assistants of various kinds may be able to operate from fixed central registries on a day-by-day, hourly, or some other acceptable method of service, to individual or different patients, in such a way as adequately to meet all the demands of the patients for nursing care and of the home for assistance and still keep the assessments to be made upon such homes and people down to figures which each and all may be able to pay. As to how far the State or the Municipality should be called upon to enter into such co-operative service may not yet be determined. Time alone will bring solution to these important nursing problems.

After all, is not this essentially the Woman's Problem, the Problem of the Mother in the Home, the Problem of the Mother with her sick child, or for service for those best loved, the service of woman for woman. May not the solution be best left in woman's hands.

The Six Questions

COMMENTS on the six questions listed below, from a group of outstanding Canadians, were published in the July issue of THE PUBLIC HEALTH JOURNAL. The additional ones given here conclude the discussion for the moment, but other aspects of the matter will undoubtedly be dealt with in future issues.

THE SIX QUESTIONS

1. Does the present-day parent compare favorably or unfavorably with the parent of past generations?

2. To what extent can parents be blamed for juvenile delinquency? And in what respects?

3. Can a parent, by controlling environment and companionship, mould the character of the child as desired?

4. Do you believe in the principle of parent education? If so, what should it include?

5. At what age do you think parent education should start? Should it be before or after marriage?

6. Do you think the inclusion of health as a major topic in a parent education scheme might do much to increase the physical well-being of the country?

JUDGE EMILY F. MURPHY
Police Magistrate, Edmonton, Alta.

Judge Murphy prefaces her comments with the statement that she has nearly been forced to give up educating parents. The good ones don't need education and, with the others, she is beginning to feel that the only thing which will have any marked effect upon them is to put them under a bond or make them pay a fine.

1. It is safer to say they compare favourably. Honestly, I don't know!

2. The question is too wide a one to answer casually and is too varied in its aspects.

3. This question may be answered more easily by saying: Produce good parents if you want good children.

4. Every hour and every incident is educative to all of us—parents included. The trouble seems to be that many parents fail to make use of their education. They just won't.

5. A girl's education starts with her doll and for the most part continues up to her marriage. The same does not apply to boys. They get practically no training for parenthood. Teachers, parents and police are kept occupied merely in trying to educate them as boys.

6. It is all right to educate parents—*if you can*—but I am doubtful of it. Tell them they ought to be educated and see how they will object. The same thing happens when you tell a foreigner he should be "Canadianized" or a western broncho that he must be "tamed." The thing has to be done by stealth if you are to succeed. But try it by all means.

SIR ROBERT FALCONER
President, University of Toronto

I do not know enough about conditions to give any answers that would be worth consideration. The chief question I ask myself is, if you are to educate the parents who is to do the educating? I should like to have been educated myself, but I never saw the person whom I would be quite willing to accept as my teacher.

The last question I quite agree with and I believe that the more we can instruct parents as to conditions of health the better. Of course, I also agree with the idea that parents might be given certain very simple principles in the matter of general education but they have to be imparted by an extraordinary type of person.

PROF. PETER SANDIFORD
Ontario College of Education

1. In many ways more favourably. There is an awakened sense of responsibility, but parents of to-day do not know how to meet their problems. In the past the task was easy. The children simply were repressed.

2. The changing social situation is chiefly responsible for juvenile delinquency. We do not fit in to the rapidly changing environment as freely as we ought. Parents, if trained, could help the matter. If they can't help, then nobody can.

3. To a great extent, yes. But there are rights of the child as well as the rights of parents. The problem is to develop the child to fit society without infringing on the inalienable rights of childhood.

4. Yes, strongly. Children inherit traits and capacities. Parents should know about this and how traits and capacities are unfolded by

education and training. Every parent should be a child psychologist.

5. Before, if possible. Seventy years ago Spencer pointed out that we trained people as if they were never to be the parents of children. The whole subject has been taboo, simply because sex was taboo.

6. Yes, the child must first be a healthy animal, but health is only one of the many topics that should be dealt with. In many ways physical health is much easier to secure than mental health, yet the latter is just as important.

Dr. Margaret Patterson
Judge of the Women's Court, Toronto

"I feel that the average parents of to-day are helpless because of their lack of training," Judge Patterson comments. "Unskilled labour is not sufficient to meet the needs of guiding children safely through the many and varied attractions calling them away from home to-day. Scientific instruction that would appeal to reason is needed and can only be given by those trained to the task. Education of parents is one of the greatest needs of the country to-day."

1. Present-day parents are the product of a stern, but unscientific discipline by their parents. They have been given no proper training to prepare them for the duties of parenthood, and, in the midst of the complicated social system of to-day are unequal to the task of guiding their children.

2. While a few parents may be indifferent, the great majority are anxious to do what is best for them, but being untrained for the duties of parenthood, are not able to give scientific instruction. A normal child is not satisfied with anything else.

3. It is not enough for a parent to control the environment of the home, for no matter how carefully the home may be guarded the greater part of the child's waking hours are spent outside of it. As far as possible, the home should be made the chief recreation centre for the child and the child encouraged to bring all its friends and companions there.

4. There is no question regarding parent education for surely the most important duty of all should be prepared for in advance. This education should include self-control and a knowledge of the rights of others, as well as a clear understanding of the facts of life and a vocabulary in which to express them. They should also realize the dignity and honour of parenthood and be willing to make any sacrifice for the good of the children. Children cannot be brought up in the spare time. It is a full-time job.

5. With the grandparents, if possible, but certainly with the parents in childhood. In any case, before the baby comes and ever afterwards, if they are to be companions and counsellors of the children.

6. Yes. Health is the foundation on which other things should be built, but parent education should include not only the physical but the mental, moral and spiritual as well.

HON. L. A. DAVID
Quebec

From the Quebec Department of Health come interesting comments on the last three questions under discussion. As far as the matter of the parent moulding the character of the child by controlling environment and companionship is concerned, Hon. L. A. David believes this can be done to a certain extent. He is a firm believer in the principle of parent education, but the question of what it should include he considers a very wide one. He suggests "general hygiene," however.

Parent education, he believes, should start before marriage, but the exact age depends on the mentality of the individual child. Health, he concludes, should undoubtedly be one of the major topics in a parent education scheme.

In conclusion, it is worth noting briefly the exact reasons why the Canadian Social Hygiene Council has presented this symposium of comments. It was felt that one thing which was urgently required in furthering much needed work along these lines was a collection of opinions on the subject. In short, the whole matter would benefit greatly by some definite catalogue of ideas on it. Reading one man's opinions induces others to formulate their own. In this particular case, moreover, there is no existing formula by means of which effective results may be guaranteed and the work is almost entirely experimental. In attempting to develop it, the Canadian Social Hygiene Council greatly appreciates the assistance rendered by the presentation of the viewpoints of others, particularly so when they are so frankly given and when they come from Canadians whose consideration of the problem is of very concrete value in evolving a plan of action. This was, it may be repeated, by no means intended as anything in the nature of even a semi-scientific treatise. It has merely been an open discussion.

Evaluation of Public Health Nursing

By A. B. CHANDLER, M.D.

Read at the Public Health Nursing Section, C.P.H.A., Toronto, June 15th, 1927.

THE title of this paper may be misleading as the writer has based his deductions solely on Public Health Nursing as directed to the infant and young child. It is considered that a somewhat similar evaluation could be made of other types of public health nursing.

The educational methods of the Public Health Nurse have changed so little in the past few years that one is justified in making the query, is it not time to have them studied to see whether they have kept up with the appetite of the public, and to what extent is the improvement in public health as it affects the young child, due to her efforts.

It is not difficult to make out a good case for public health nursing. Numerous papers have been published every year on this subject, and the lay press from time to time eulogizes this type of nurse and all her work. My long connection with a private organization, watching it grow from year to year and noticing especially the increased demands on it made by the people it was organized to serve, is my only excuse for making this report. I must confess too that my connection with other parent training work has made me a little anxious for fear that the rapid strides being made in other directions are going to belittle the magnificent work of the Public Health Nurse.

This is a preliminary report of a study being conducted over a period of several months by the Child Welfare Association of Montreal, to take stock of its work and especially to see how we could meet a steady increase in the work without lowering its quality. This organization, like so many others, is troubled with growing pains. The work increases each year from ten to twenty per cent. with little or no increase in the budget. The methods we have devised of evaluating the work of the nurses are not set down as standards, but are enumerated in the hope that with others making similar studies we may eventually have some standards for comparing the work of different organizations in this field.

For years Public Health Organizations in this field have gauged their work almost entirely by the mortality rate of infants under one year of age. Ten to fifteen years ago the saving in infant lives was thought of in terms of milk distributing plants and the furnishing of bottles of modified milk for the mother to give her child. This method was given

up primarily owing to the expense, but also largely because our experience has shown us that milk alone has little to do with the saving of infant life.

A little later we were clinging to the theory that pasteurizing the milk was of prime importance. While there is no more ardent advocate of pasteurization than the writer, experience has shown that it has been tremendously over-estimated as a factor in reducing infant mortality. The almost universal practice of boiling the milk for all infants, and the necessity of proper care of the milk in the home, prove that we must not over-rate the importance of pasteurization for this particular use of milk.

So many factors must be taken into consideration in a study of the reduction of infant mortality that it is almost impossible to allot the proper share to each. Improved obstetrics and nursing, better housing and increased knowledge of tuberculosis, and more adequate care to lessen communicable diseases have all been important factors in this question. The rapid increase in the number and knowledge of the pediatrists, with the better training of the physician in the care of the young child, have had an important bearing in this matter.

Birth registration is another factor to be taken into consideration in studying infant mortality. An accurate infant death rate necessitates complete registration. The more births registered the smaller the proportion of those who die. This is of such importance that many have a corrected infant mortality rate derived from increasing the number of births registered to what they estimate it should be.

The estimation of the value of public health nursing by the mortality among the babies cared for by the nurses is even more unreliable. One could then get good statistics by only accepting good risks. Reckoned in this way the mortality of the Child Welfare Association of Montreal is 1.1% as compared with .99% reported by the Chicago Infant Welfare Society for 1926. This method of evaluating work is mentioned only to be condemned except in so far as it may be of interest to the organization concerned. For comparing the results of different organizations it is of little value.

Most organizations feature the number of the nurses' visits to the homes and create the impression that this is one of their important methods of showing the value of the work done. The poorest educational work might be done by the nurse making the greatest number of visits. Chicago reports an increase of 25% in nurses' visits and a decrease of 9.7% in conference attendance of infants during 1926 as compared with their 1921 figures. Is it a sign of progress to have nurses' visits increase and conference attendance decrease? There may be factors of importance which are not mentioned that would explain this anomaly. This may

mean that the private physician is working more closely with the public health nurse.

We decided some months ago to make a study of the visits made by our nurses to see if we could secure information of value to us in re-arranging duties and allowing time for other types of work. The first thing we attempted to find out was why the visit was made. At a conference with the nurses it was decided to group the reasons under eight headings as shown in Chart 1. This explains fairly well why we visit. Some explanation may be needed as to why friendly visits are made. I think that it is a legitimate type of visit and am rather surprised that it is so small. Each Centre has a certain number of mothers who are a distinct asset to the work and by their efforts fully repay the small amount of time used up in this way. The heading "In Vicinity" was rather disappointing as I had hoped to find here a large number of visits that could be dispensed with. This figure of 6.7%, I think, indicates that the nurses are not trying to swell the number of their visits by simply making perfunctory calls.

Particular attention should be given to the small number of visits paid to secure babies whose address we have been given by the Royal Victoria Montreal Maternity Hospital or the Victorian Order of Nurses. These visits comprise only 14% of the whole. This is of interest as we are under a handicap not faced by other places in not being able to secure birth registration lists from the local health department. The great majority of the babies enrolled come entirely unsolicitated, due to the educational efforts in the past and to the established place the organization has in the neighbourhood.

It was decided that one method of evaluating our work would be to ascertain how many of these babies whose addresses we knew eventually arrived at the Health Centre and also the age at which they arrived. It was thought that this would give us a good idea of how effectual the nursing visits really were and possibly give us a point of comparison with other organizations. Over a period of 12 months 993 babies were referred by the Maternity Hospital at the age of two weeks or thereabouts. 72% of these were duly registered on being brought to the conference. 6% were not found; 5% were referred to French Centres as being more convenient for the mothers. The remaining 17% were not registered owing to the following difficulties; children of large families, children of unmarried mothers, long distances to travel and lack of interest and co-operation.

Of the number who registered 51% came in the first month of life, 38.5% in the second month, making a total of 89.5% under two months of age. This we consider an important way of evaluating the visits of the nurses and the zeal they are putting into the work.

Chart II shows the nurses' reasons for visits grouped according to the type of district they are working in, the districts being divided according to the economic level of the families attending the Centres. Group III represents the slum areas and one-roomed apartment districts, Group I represents the districts where mechanics live and II an intermediate class. It would seem from this chart as shown by Group III the people obviously requiring good prenatal and obstetrical care are not availing themselves of it. On the other hand, the slum district gave us, as was to be expected, a much larger proportion of visits referred by other organizations in Financial Federation. The visits for routine supervision are naturally much higher in the lower grade district. The visits made for definite health reasons are about the same in all three types. The other point of interest is the large number of visits for non-attendance in Class II. This, however, is the usual finding as the people of this class frequently over-estimate their own knowledge.

After finding out why the nurses visited, we were eager to discover how successful they thought they were. At first sight one would say there was little value to this method as the optimist would overrate her work while the pessimist would feel that little had been accomplished. However, on comparing the statistics of the nurses we considered optimistic, with those not so much so, we were surprised that there was little difference in their own evaluation of their work. Chart III shows that 53% were successful and 24% partially so. It was here we found considerable wastage, though possibly not an undue amount. The 10% of visits paid on people not found at home or moved is, of course, a dead loss. The unsuccessful visits are nearly a loss, while for the doubtful ones, you must draw your own conclusions. This totals more than 22% of all visits that were either not satisfactory or were a dead loss. A large number indeed, but a problem that is difficult to solve under methods now in vogue in public health.

Chart IV shows the same evaluation by the nurses of their visits, but classified again according to the economic level of the inhabitants. The mother of the middle class is here seen to be out at the time of the visit most frequently.

The mother from the low grade district furnishes the largest total of visits that were successful or partially successful. It will be seen that there is little difference in the different types of district as to the successful visit.

Chart V is a comparison of the result of the nurses' visits by reason for visiting. One fact to be noted is the high percentage of successful visits in the "A" class, that is when visiting for a definite reason. We were rather surprised to find that all friendly visits are not successful, where the people are at home. The reason given for non-success was

that the mother visited was otherwise occupied and could give very little attention to the nurse. Another outstanding feature is the large percentage of visits not found in the "D" and "E" class.

In the "D" or follow-up class the reason is usually that the people have moved away without notifying us. In "E" cases referred to us by other organizations the percentage of not found is due to wrong addresses.

Chart VI shows what we think is one of the best methods of evaluating nurses' visits. Getting the babies to the conferences is really accomplishing something definite that we can measure and compare with other organizations. It proves that the mother is making a definite effort either as a result of a nurse's immediate visit or owing to previous educational work on her part. This chart represents over 3,000 babies that registered for the first time in 1926. More than 1/3 came before they were a month old. It is a well-established fact that early registration is necessary if successful teaching in breast-feeding is to be accomplished. The total registered under two months reaches 56%, which compares favourably with other organizations reporting in this way. Of the babies whose address was furnished to us when two weeks of age 89% of those who came were brought by their mothers before reaching the age of two months as has already been stated.

It is rather surprising that the educational methods employed by the Public Health Nurse have been so little criticized during the last few years when our schools and universities have been almost constantly under review. It would seem that the public health nurses' methods of education have been the only ones exempt. This may be due to a lack of questioning from within. This has not been a good thing for public health as it has had the effect of maintaining the same methods used ten to fifteen years ago. Outside of health work in schools little effort has been made to get away from the most expensive type of teaching—that of laboriously walking the streets to teach the individual mother in her home with a dead loss of 10%, as I have shown, of the time by the pupil being out—a serious loss of another 12% and a partial loss of 24.1% representing the partially successful visits. These percentages are pretty accurate, I feel sure, and probably as the valuation is done by the nurse herself would err on the optimistic side. This method of home visiting was the only suitable one when it was devised years ago, at a time when the nurse had to go into the home and beg the mother to bring her child to the Health Centre. I have shown that this is no longer the case in a very large percentage of our families. A large section of the public is willing and anxious to have what the nurse can teach. Is it not time, then, to make such changes in our procedure as are necessary with this increased interest in health. Should we any longer rely entirely on this most expensive type of education yet

devised—the instruction of the individual in her own home. Some visiting will always be necessary, but I feel that it can be cut down more and more as the years roll by.

The largest percentage of nurses' visits are for "definite reasons of health." That is, she makes the trip taking from fifteen minutes to an hour to teach something that in many cases by better organization could have been done in a fraction of the time at the Centre either to that mother alone or to a group of mothers at a still smaller expense to the organization.

We have had the nurses list all the questions asked by parents during their visits and while the mother is at the Centre. In infant work it is surprising how few the problems are and also how frequently some dozen of questions are asked. Can you recall how many times a day you have been queried about teething and constipation? Did anyone ever spend a day in infant welfare visiting without being asked about regurgitation. How often do you make a visit because some mother is troubled by her child regurgitating? I have only mentioned three common troubles of infancy, but they occupy a large part of the nurse's time. Each of them make an excellent topic to take up before a group of mothers.

We have tried out the method of teaching in groups for the last eighteen months and find it very satisfactory for both nurses and mothers. During 1926 we had 89 group teaching classes with a total attendance of 1,127, making an average attendance of slightly over 12. This means that a nurse can teach 12 mothers in a portion of the afternoon about some topic of vital interest to them. The mother is in a receptive frame of mind as she has come to learn. This is not true in a crowded conference nor even in her own home where she may have many other things which need to be done at the time the nurse calls. The discussion following the talk is freely entered into and usually brings to light phases of the question that would be missed entirely in an individual talk by the nurse.

We have never been able to reach the pre-school child in large numbers because of the expense involved in this type of public health nursing as usually carried on. It is surely not exaggerating to say that it is three times as expensive as looking after the infant. We have, however, been working on a plan of medically examining a group of 20 pre-school children at a Centre and than enrolling the mothers in a group for a course of 12 talks on the subjects of special interest to parents of children of this age. This type of work is relatively cheap and we feel is much more satisfactory than the visiting method. One of these groups was such a success that the members formed themselves into a club and have met regularly for the past year to discuss questions

about children of this age. This club is still alive and shows no signs of inanition.

The problems of health at this age are so interlocked with the child's social and mental outlook as to make it necessary for the public health nurse to make a more careful study of the child as a whole than she has heretofore done. Parents are demanding more and more knowledge of "how to do" rather than "what to do." This is work that must be revised or the nurse will lose the pre-school child to the psychologist, mental hygienist or nutrition worker.

Conclusion

Evaluation of Public Health Nursing may be summarized as follows:

Statistical Method exemplified by:

1. The proportion of babies registered under two months.—This is of definite value.
2. Attendance at Health Centres and number of nursing visits paid.—This may or may not depend on the quality of the work done.
3. Mortality and Morbidity rates.—The share due to the Public Health Nurse is difficult to estimate.
4. Percentages of Defects corrected.—This is important at all ages.

The Public's Evaluation

1. The regular increase in the demand for the work of the Public Health Nurse.
2. The willingness of parents to accept her teaching, *e.g.*, the response to Diphtheria and Scarlet Fever prevention. The percentage of cases who return for the complete course. (In this organization 95% completed their course for Diphtheria Immunization.)
3. The unsolicited attendance at clinics.
4. The attendance at group teaching conferences.

Nurses Evaluation

Of great importance to the Organization concerned and valuable to other Organizations if supported by statistical and community evidence as already enumerated.

Professional Evaluation

This would include the above-mentioned methods together with the *esprit de corps* and the amount of original work done.

The Sanitary Inspectors' Association of Canada

Plumbing and Health

By W. H. MEADOWS,
Chief Plumbing Inspector, Toronto, Ontario

(Read before the Annual Convention at Brantford, Ont.)

THE subject which I have been asked to speak on, viz., "Plumbing and Health," is a large one, and one which I am not sure I can do justice to in the short time at my disposal.

In the first place I think it should be changed to "Good Plumbing assists in keeping good Health." To have leaky and defective plumbing and drainage means inhaling impure air, and to inhale impure air lowers the vitality and leaves the human system open to attack from many of the diseases which flesh is heir to. Now, I do not mean to state that if the plumbing and drainage of your building is absolutely tight it will prevent you from becoming sick, but I do claim that it will assist in keeping the air from becoming impure. With this thought in our minds let us look at some examples which have been handed down to us, and see if we can get a reason for our position.

It is well understood that a mastery of the principles of sanitation is essential not only for the welfare of the individual owner and occupants, but also to a greater or less extent for that of all neighbouring property owners. Disease originating in one locality may "despatch invisible messengers of death to poison the air" some distance away, and both science and philanthropy now unite in teaching us that every man is in large measure responsible for the well-being of his fellow men, and no where more clearly than in the domain of sanitation is it shown that man is in reality his brother's keeper. Nowhere is the doctrine that society is an organism in which the individual members correspond to the separate cells of the animal organism in being mutually dependent for their complete health and development more clearly illustrated than here. Nowhere is it made more evident that sanitation should become the subject of wise legislation to the end that the health of the community may not be prejudiced either by ignorance or poverty.

In the middle ages cities even as magnificent as Paris and London were very dirty places, the streets being described as more foul than the most abominable sewers, the horse manure standing in them, according to one writer, sometimes as much as "a yard deep." It is recorded by the royal physician Rigord that one day, while King Philip Augustus

was looking for recreation from his audience chamber window, he saw some citizens' carriages passing below "when the substance forming the street, being stirred up by the revolution of the wheels, emitted a stench so powerful as to overpower Philip. This so disgusted the King that he urged the citizens to pave the streets; and to assist in effecting the purification of the city, he built a wall around the cathedral to prevent it from remaining longer a common corner of convenience."

Much as we are shocked at hearing these stories of the old chroniclers, we have, after all, much less reason to congratulate ourselves on our progress since those dark ages than is generally supposed because we have been criminally slow in applying for the general good knowledge which we have since acquired. Mediaeval conditions still exist in the tenements of the poor, a rebuke and a menace to modern society, because we have not yet learned that the real and only perfect welfare of each lies in the perfect welfare of all. Our ground for congratulation is proportional only to our progress in the acceptance of this truth. To this is due our sanitary legislation and the aid society gives in the execution of these laws to those too poor to make application of them themselves.

As a preliminary to a better understanding of the subject it should be borne in mind that normal atmospheric air contains on an average, in 10,000 volumes, only about three volumes of carbonic acid, the oxygen and nitrogen standing in the relation of 2,000 to 7,910. If the carbonic acid increases to the amount of 50 to 100 volumes in the 10,000, it becomes fatal to human life, and with sulphuretted hydrogen 10 to 12 volumes in 10,000 becomes fatal. Yet these amounts are constantly exceeded in unventilated cesspools and foul sewers.

A choked sewer of Paris was found by Clanbry to contain 201 volumes of carbonic acid, and 299 volumes sulphuretted hydrogen in 10,000 volumes of air.

In another case he found 340 volumes of carbonic acid and 125 of sulphuretted hydrogen in a Paris sewer, and an average of 230 of carbonic acid and 81 of sulphuretted hydrogen in 19 cases.

Letheby found 53.2 volumes of carbonic acid in a London sewer; Miller an average of 10.6 in 18 cases and of 30.7 in 6 cases in London; Beetz an average of 31.4 in 8 Munich sewers; Laws an average of 69.2 in three London sewers, and 93.1 in another London sewer, even as late as 1892.

Cesspools are likely to be as bad or worse.

It goes without saying that the analysis of the air, of most sewers of more recent date does not show such alarming amounts of poisonous gases and they should not show any dangerous amount at all, but instances of the kind do still occur, and, in the case of cesspools, dangerous foulness is very common.

I think we will all agree that to inhale such would be very injurious to the human being, but let us see what effect it had on animals.

Dr. Alessi experimented in 312 animals, of which 179 were exposed to the sewer-gas and 133 were kept in fresh air. Of the exposed animals 143 died when inoculated with the bacteria; whereas of the animals not exposed only three died, all of which were rats.

He found that the animals acquired the predisposition to infection more easily during the first two weeks than after that time, which may explain in a certain degree why individuals who habitually breathe sewer-air become habituated to it and acquire a certain immunity from intestinal and other infections.

Dr. Hankel, in recording cases of injury from breathing cesspool air, has classified the effects into (1) the mild form; (2) the fairly severe form; (3) the severe form; and (4) the chronic form. The first, he says, is well known among sewer men, the symptoms being the feeling of a heavy load upon the head and chest, and in worse cases vomiting, severe pains in the abdomen, diarrhoea, giddiness and weakness, with disturbances in the action of the heart and lungs.

In the second form the skin becomes cold and covered with cold perspiration. Severe pains are felt in the stomach, throat and muscles. "Delirium, convulsive twitchings of the muscles, fainting fits, singing and talking, have frequently been observed at this stage." Then follow unconsciousness, convulsions and other serious symptoms.

In the third, or severe form, death occurs. The workman, on entering the very foul cesspool, "collapses all at once as if he had been struck by a bullet," the entrance being accompanied sometimes by severe convulsive fits, vomiting, foaming at the mouth, etc.

The chronic form has been observed in labourers in mines and chemical works, and is not applicable to plumbing.

Many cases have been reported, on good authority, of deaths through cesspool air poisoning of the severe form from very foul cesspools. They have occurred in places where the products of decomposing and putrefaction were in a highly concentrated state, and under circumstances admitting of no doubt whatever as to their cause. They illustrate what may be termed the "direct" or "mephitic" (probably chemical) action of sewer gas, as distinguished from the "indirect" or "predisposing" action.

In addition to these practically demonstrated cases we have the records of a different class of accidents resulting in death, which must be accepted as caused directly or indirectly by cesspool air, not with the positive proof of the first, but with sufficient evidence to leave no doubt in the minds of the physicians reporting them, or of the courts in several cases where they formed the subject of lawsuits. They are, in a

certain sense, more interesting than the others, because they occurred under conditions more common, that is, under conditions in which the public, as a whole, are involved and not merely the comparatively small number who are obliged to work in the sewers.

The accumulation from year to year of similar records brings the evidence closer and closer to the value of positive demonstration, and at any rate it will be wise for the public to accept them as such inasmuch as they constitute the best proof to be obtained until individuals are found public spirited enough to voluntarily surrender themselves in the interest of science to such experimentation as has been made by Dr. Alessi on animals.

We come now to the other forms of sewer-gas poisoning designated by Hankel as the "mild" and the "fairly severe" forms. But before presenting a few of the recorded cases it is important as a preparation for properly understanding them to review the recent researches of Dr. Alessi on the effect of sewer-gas in predisposing the system to special disease infection. His experiments were made upon animals of different kinds, and resulted in showing that after exposure to the influence of putrid gases, including sewer-gas, inoculation with the germs of certain diseases killed them, but that these germs failed to kill when the animals had been kept under normal condition.

He took rats, guinea pigs and rabbits, and exposed some of them to sewer and other putrid gases. The rest he kept as a control experiment, under normal conditions, and after a while inoculated all of them with the bacillus of typhoid fever and the bacterium coli communis, and then he carefully observed and recorded the results produced on both sets of animals, including microscopic examinations with cultures of their organs and blood.

On the other hand, the scoffers pointed to the experiments of Carmichael, Wernich, Miquel and others, and declared that disease germs could no more escape from sewage than a sausage could jump out of a kettle of water, and that the fear of sewer-air was altogether irrational. The plumber, they said, is a sufficient refutation of "their notions," for he works at the very jaws of the sewers and flourishes on their breath. They seemed to ignore the fact that plumbers do suffer, when exposed to foul gases, and that the most prudent of them take the precaution to keep the "jaws of the sewers" well gagged while they are at work upon them. It is their custom to complete the plumbing work before the sewer connection is made, so that sewer-gas is not allowed to play about the building with such unrestrained license as many seem to imagine. But, as compared with workers in other trades and professions, plumbers lead an out-of-door life largely in buildings but partly completed or closed in, and must be in the full vigour of youth to carry

on to the best advantage their somewhat arduous calling, and the experiments of Alessi show that the system undoubtedly becomes inured to some extent to inhaling the products of decomposition.

These facts enable them to withstand the enervating effects of exposure to sewer-air better than others, and so far as the pathogenic bacteria are concerned, it is in the feeble body, debilitated by confinement and impure air that they make most headway when once they gain entrance.

But, you say, those quotations are of English origin. True, still I have in my mind just now a case where a plumber who had been ill, upon commencing work was sent to repair an old waste pipe, and owing to the position of the pipe, he was forced to remain with his head immediately over the pipe. A few days afterwards he was again taken sick and his body and face broke out with sores. In this case his doctor ascribed the origin of the trouble to his inhaling the impure air of this old drain. (Page 121, A.S. of S.E., 1915-16-17.)

These few illustrations, I think, will clearly connect plumbing and drainage with health, and with all the foregoing facts it will be agreed that sewer and drain air is a good thing to keep out of our homes. I may say that plumbing as now constructed under most of our by-laws is something which can be considered an *aid* to health rather than (as in the past) something which is dangerous to have near you. In other words, we might ask ourselves what have we accomplished to date, and by way of answer might say that the inspection of plumbing has given the general public confidence, by teaching them if plumbing and drainage be properly constructed it removes the chance of being dangerous to health. Our work has caused them to place more conveniences in their buildings and thereby reduce labour to the house-wife; it has purified the air of the home and factory; it has removed the dampness in cellars; it has caused the discarding of the open storage tank for drinking water (this was usually placed in the attic or bathroom); it has caused all rooms which contain a water closet to be directly connected with the outside air; and in most cases allow sunlight in; it has encouraged the improvements made in fixtures and discouraged the use of objectionable ones till to-day we have our fixtures made of non-absorbing substances; it has removed the bad odours which formerly came from defective plumbing and drainage; it has awakened the authorities so that our factory laws contain clauses referring to it; it has proved that plumbing fixtures properly installed are no longer a luxury but rather a necessity to good health; it has taught the public that work constructed under by-laws is not only right when constructed, but material has been used in the construction that will last for some time; it has taught the owner of property that buildings without proper sanitary conveniences are no

longer an asset but rather a liability and it has taught the unscrupulous person that he must not do anything to plumbing and drainage which will cause ill health, and he must respect the by-law which governs it.

We have recently heard that the Public Health Department should look after the child from birth. We say that our plumbers are doing its share towards that point, for we go one step farther and look after the parents' health before the child is born by keeping the plumbing and drainage of their home in good condition, which gives them a chance to keep in good health and thereby hand down to their offspring good health and healthy homes to start with; this in itself should more than repay any cost incurred in the installation of good plumbing. Then, again, by having encouraged the improvement of plumbing fixtures, we have made it possible to place the bathroom conveniently near to the sleeping rooms, which will materially help from a health standpoint as it can be used when required; it has also made it possible to instal any of the many kinds of fixtures where most convenient without the chance of causing ill-health.

Recently, to prove that the proper facilities lead to better personal hygiene, a test was made in a Public Comfort Station and the results were as follows: where there was hot and cold water 82 per cent. of the people who used the comfort station washed their hands; with cold water only this dropped to 28 per cent. Where there was soap in a holder 42 per cent. used soap, where common soap only was used, it dropped to 16 per cent.; where there were individual towels 90 per cent. used them, while with a common towel only 60 per cent. used it; when there were no towels only 22 per cent. washed their hands.

Toilet articles used in common are in some measure a means of spreading disease, unquestionably poor toilet facilities also spread disease; convenient well-kept public comfort stations will lessen the factor in the spread of disease. While speaking of Public Comfort Stations, let me say that something will have to be done and done quickly to provide all cities with these stations. Consider the inconvenience and possible danger to health a stranger must experience who comes to your city on a public holiday. It is bad enough when all the department stores and public buildings are open, but on a holiday the only places open are hotels and everyone does not wish to go into the wash rooms of these places.

I wish to point out that the present high standard of plumbing and drainage in our modern buildings has not been accomplished in a day. Our city has been striving for the last 39 years to reach the standard it has to-day attained, and I say, not boastingly, but at the same time I must maintain our efforts have not been without success.

I might add here a little on what a plumbing inspector should be

and what he does. A plumbing and drain inspector has to deal with the most important part of house building, and should he neglect or not know his business there is no telling how far reaching the effect might be, for the occupant of the house knows nothing about the work, in fact very few know how to properly use the various fixtures after they are installed. The inspector's duties are to see that the laws are complied with and to protect the public from imposition by unscrupulous plumbers and the dangers of unsanitary work, and when you consider that most of his work is covered up after he has passed it, you will realize how important it is that his work should be thorough. If I were able to picture to you some of the complicated pieces of work he is called to see properly constructed, and the many ways in which it might be wrongly installed, you would see at a glance why it is important that the inspector should be a practical man and possess careful judgment, be thoroughly familiar with sanitary science, as while the plumbing laws are usually very explicit and outline his duties, yet there are often little intricacies arising which may not be covered by the law, and he should be in a position to know at once whether the plan of installation proposed will comply with the intent if not with the letter of the law. He, in fact, plays a very important part in the life-saving crew of the Health Department, and I think the advances made in plumbing and drainage till they have reached the present high plane (in some cities at least) must be placed to his credit, for had he not been persistent in pointing out defects and thereby educating the trade, we would not be as we are to-day in house plumbing.

We find the first Sanitary Law was passed in London, England, in the year 1365 A.D., during the reign of Edward 3rd, but was more to protect the trade than secure sanitary conditions of buildings. Again, in 1388, a law was passed to prevent the pollution of water in rivers. This one might be considered a step in the right direction, but no special measure was passed which was applicable to the whole country till the year 1831, when the ravages of the Asiatic Cholera woke them up and a general law was enacted; while these laws, no doubt, were applicable to us, it was long afterwards that our own Legislature passed a law bearing on this subject, and while it was good for its time, circumstances changed so fast and our knowledge of sanitary matters increased that it was not long before it was considered of little use, and our own citizens decided if conditions were to be improved and the standard raised they would have to pass one of their own. This they proceeded to do in 1887, and likewise appointed inspectors to see that its provisions were carried out and lived up to.

True, we have sanitary laws, but legislation can do but little unless aided by the cordial co-operation of each individual of the community;

and to no class of people in the community is given the opportunity to be a material factor in the preservation of the public health than is given to those who follow the calling of plumbers and drainlayers, for the comfort and healthfulness of buildings, especially in towns and cities depend in a great measure upon the adequacy and thoroughness of the plumbing and drainage, and as the health of the inmates is seriously affected by defective work, it is necessary that their work should be thorough and conscientiously performed. The general public is profoundly ignorant of the importance of thorough plumbing and drainage, and in many cases we must protect people against the evil consequencee of their own ignorance. As we have said, many communities have sanitary laws which greatly aid them in constructing systems as they should be, but the standard they fix is the lowest that will be tolerated or that the public safety will permit, and not the highest standard attainable. We should carefully weigh and consider the arrangements of every case separately and should aim to supply the most perfect system that can be devised. We should not limit ourselves to the specific requirements of the law, but should do as much better as the circumstances will permit.

Monthly Jottings of the Sanitary Inspectors' Association of Canada

In order to open up various sections of the Constitution for discussion at the ensuing Annual Convention, a number of proposed amendments will be submitted for consideration. These will deal with the annual subscription fee, the qualification for membership and associate membership, suspensions and reinstatement, etc. Each member will shortly receive a copy of these proposed amendments.

In the case of amendments to the Constitution, do not forget that members not able to attend the Convention may vote on the amendments by proxy. This is only fair to those not able to attend, and ensures that the Constitution shall not be changed without every member having a say in the matter. Proxies may be given to any member who will attend the Convention, or may be entrusted to the Secretary.

Mr. H. Cusack, Chief of the Division of Sanitation, Toronto, and Mr. A. White, Chief Provincial Sanitary Inspector, are working hard on the programme for the Convention which opens on Wednesday, September 14th.

We already have several invitations for the 1928 Convention. The Board of Trade of Regina is the latest. Both Vancouver and Victoria desire our presence, and Winnipeg will probably think it time for another meeting in the centre of Canada. Hamilton also sends us an official invitation.

The six candidates who sat for examination in Winnipeg in April were successful in gaining Sanitary Inspectors' Certificates. These candidates were all trained in a six months' course of lectures and demonstrations by our Secretary-Treasurer, Mr. A. Officer. Three of them were already in the Public Health service, one as a nurse, one as a clerk in the Health Department, and the third as Laboratory Assistant. The occupations of the other three were respectively clerk, hospital attendant and plumber.

The success of this small class shows what can be done under a good private tutor. There must be in every large city in Canada some in-

spector capable of conducting similar classes. The fees charged need not be large, but the total received in a class of from 6 to 10 students makes it worth while for the instructor.

We should like to hear of more activity on the part of the other Examining Boards of the Royal Sanitary Institute in Canada. Particularly, we should like to see the Ontario Board functioning as it should and holding regular examinations. The City of Toronto would be a very suitable centre for the holding of examinations for Ontario men.

No doubt the Ontario Board has had no examinations because no candidates have presented themselves. If, however, groups of students form themselves into instruction classes and prepare themselves for examination there should be little difficulty in getting the Council of the Royal Sanitary Institute to arrange for examinations as needed. We do not know the names of all the members of the Ontario Examining Board, but a Board of Examiners was appointed in 1914 when Dr. Amyot, now Deputy Minister of Health at Ottawa, was the Chairman of the Board. It does not appear whether the Board ever held any examinations. If, however, it can be shown that any candidates are desirous of sitting for examination, it should be an easy matter for the Ontario inspectors to correspond directly with Mr. E. White Wallis, Secretary and Director of the Royal Sanitary Institute, 90 Buckingham Palace Road, London, S.W. 1, with a view to having the Board reconstructed.

If preferred, the Institute would probably co-operate with the Ontario Government in setting up a Joint Examining Board consisting of representatives appointed both by the Government and the Royal Sanitary Institute. The certificates issued to the successful candidates by such a Board would bear the name of the Government and would thus become the first really Canadian Sanitary Inspectors' Certificate issued.

In a matter of this kind your Executive Council will be glad to render any assistance possible on request.

ONTARIO

The Provincial Department of Health of Ontario

Communicable Diseases Reported for The Province by Local Boards of Health for July 1927.

COMPARATIVE TABLE

Diseases	1927 Cases	1927 Deaths	1926 Cases	1926 Deaths
Actinomycosis	1	—	—	—
Cerebro Spinal Meningitis	2	2	6	3
Chancroid	7	—	1	—
Chicken Pox	550	—	503	—
Diphtheria	194	18	183	14
Dysentry	—	2	—	—
Encephalitis	3	2	5	4
Gonorrhoea	130	—	131	—
Influenza	2	4	—	10
German Measles	126	—	150	—
Infantile Paralysis	1	—	—	—
Erysipelas	2	—	—	—
Measles	915	3	1955	8
Mumps	112	—	37	—
Pneumonia	3	104	—	137
Poliomyelitis	2	1	—	—
Scarlet Fever	240	3	289	3
Septic Sore Throat	1	—	—	—
Small Pox	97	—	41	—
Syphilis	89	3	118	—
Tuberculosis	135	76	177	72
Typhoid	84	2	57	3
Whooping Cough	310	6	325	—
Pellagra	1	—	—	—

The following Municipalities reported cases of Small Pox:

Ottawa 54, Kapuskasing 2, Hinchinbrooke 2, Belleville 1, Deloro 1, Thurlow 2, Brooke 1, Oshawa 3, Ameliasburg 13, Clarence 2, Braeside 4, Kitchener 3, Guelph 2, Binbrooke 1, Toronto 5.

Canadian Council on Child Welfare

RESOLUTIONS PASSED AT THE RECENT VANCOUVER CONFERENCE

1. Be it resolved that the Candian Council on Child Welfare shall so arrange its programme that the Executive Secretary shall be free to attend the meetings of the Child Welfare Committee of the League of Nations in her capacity as Assessor.

2. Whereas there does not now exist in Canada any organized machinery for putting into effect the recommendations of the programme on Recreation already adopted;
Be it resolved that the Canadian Council on Child Welfare shall instruct the Recreation Section to consult with such national, provincial, and local organizations as may be concerned, as to the advisability of establishing an organization in Canada, the functions of which shall correspond more or less to those of the Playgrounds and Recreation Association of America.

3. Be it resolved that the Canadian Council on Child Welfare shall equip itself to advise with those who are contemplating the construction of institutions for the care of children and that this service be made available to all agencies and particularly to all architects.

4. Be it resolved that the Canadian Council on Child Welfare strongly approves of the type of service rendered by the visiting teacher; that it considers that her work will be most effective when she is not only a teacher but a trained social worker and that this is a practical and effective method of connecting the interests of the home and the school to their mutual advantage and to the benefit of the child.

5. Whereas studies in Child Welfare reveal the particular needs of handicapped children, especially those who are dull and backward, and whereas such needs are becoming more manifest; Be it resolved that the Canadian Council on Child Welfare favors the establishment of special classes for such children in all Canadian schools.

6. Whereas teachers have an important place in the health training programme of the child;
Be it resolved that the Canadian Council on Child Welfare endorses and hereby instructs its Executive Secretary to send the following recommendations to the Provincial Departments of Education wherever indicated;

viz: (*a*) That health supervision of Normal students be provided during their period of training in order to assist them in attaining and maintaining perfect health, which is essential for efficiency.

(*b*) That health training and instruction be given to Normal students in order to promote right attitudes to matters of health, and to equip them for the adequate health training and instruction of school pupils.

7. Be it resolved that the Canadian Council on Child Welfare shall approach the Dominion Bureau of Statistics and the Provincial Governments for the purpose of obtaining the citation on the birth registration by the doctor, of any defect from which the child may be handicapped.

8. Be it resolved that the Canadian Council on Child Welfare shall request the Hon. J. H. King, Minister of Health, that the report on Maternal Mortality be printed in suitable form and made available for general distribution as soon as possible.

9. Whereas it is advisable to promote health services in rural areas and accurate mortality statistics would be of value in this connection, and Whereas such statistics are not now available due to the fact that deaths are registered at and tabulated against the place in which the deaths occur, regardless of the place of usual residence;
Be it resolved that the Canadian Council on Child Welfare confer with the Bureau of Statistics as to the possibility of tabulating death statistics according to the place of usual residence.

This resolution was withdrawn and referred to the Health Section for further action.

10. Whereas proper pre-natal care is considered to be of prime importance in the work of Child Welfare; and
Whereas it is recognized that the family physician has the most intimate point of contact with all homes and that he enjoys the confidence of the parents;
Be it resolved that the Canadian Council on Child Welfare request that the Canadian Medical Association do all in its power to promote more general medical and nursing supervision of expectant mothers.

11. Whereas nursing supervision is considered to be a necessary adjunct to medical supervision in pre-natal cases;
Be it resolved that the Canadian Council on Child Welfare request the Canadian Nurses' Association (*a*) to encourage a more concerted effort on the part of all nurses to have all mothers receive such care and, (*b*) to organize study groups of nurses for the purpose of ascertaining the best methods of giving pre-natal instruction and of stimulating the provision of these services.

12. Whereas there is urgent need for medical and nursing services for pre-natal and infant care in rural areas;
Be it resolved that the Canadian Council on Child Welfare memoralize the Provincial Departments of Health urging the promotion and extension of such services.

13. Be it resolved that the Canadian Council on Child Welfare take immediate steps to consider ways and means of stressing the need of the moral and spiritual development of the child life of Canada.

14. Be it resolved that the Canadian Council on Child Welfare approach the Dominion Government, urging the entire separation of the publication of the annual Juvenile Delinquency statistics from the Annual volume on criminal statistics.

15. Be it resolved that this Conference request the Canadian Council on Child Welfare to provide one day's discussion at least, on the problems of rural child welfare at its next Canadian Conference.

News Notes

Ottawa, Ont. Health is being recognized as a matter of increasing importance by women's organizations in every part of the Dominion and will be one of the most important topics discussed by the National Council of Women of Canada when it meets this coming fall.

Much of the discussion will centre around the various health matters which were considered by the International Conference at Geneva, at which a number of Canadians were in attendance. Particular attention will be paid, of course, to the welfare of women and children.

It is considered essential that the viewpoint of the working women throughout the Dominion be known if the problems which they must face are to be satisfactorily tackled. Other suggestions include the inauguration of motor health caravans to provide equipment and instruction for needy mothers and help in the care of their children as well as a request for early diagnosis of cancer in an effort to decrease the present alarming mortality rate from this disease.

Regina, Sask. Convincing evidence of the immediate results which follow the inauguration of preventive public health measures against preventable and infectious disease is contained in the report just issued by Dr. W. R. Coles, local medical health officer. It covers the first six months of 1927.

Diseases which, in 1926, showed signs of developing into epidemics have been practically controlled. During the last six months of 1926 there were 1,739 cases of measles. During the first half of 1927 there were 51 cases recorded.

An immunization campaign against diphtheria was carried on in March 1926 and diphtheria has shown a falling-off of nearly fifty per cent. in the number of cases reported.

Scarlet fever is the lone disease showing an increase but its spread is being gradually checked by the use of anti-toxin.

For the first half of 1927 the death rate from infectious diseases, exclusive of tuberculosis, was only 20 per cent. of the rate for the same period of 1926.

Toronto, Ont. New York's death rate from diphtheria has decreased, during the past year, over 41 per cent. This represents a saving of 450 lives a year in one city alone and is due almost entirely to the campaign for the use of toxoid which was begun there five years ago.

These facts are contained in a report on the progress of the battle against diphtheria throughout the United States which has just been received by the Canadian Social Hygiene Council from the American Association for Medical Progress.

During the last five years half a million New York children have been protected against this disease, and in addition to the decrease in the number of deaths the number of cases has been cut 34 per cent.

Statistics were collected from 70 American cities. They showed that the two communities which shared the distinction of having the lowest death rate from diphtheria—New Haven, Conn., and Youngstown, Ohio, where the rate was 0.6 per 100,000 of population—were both cities where there had been intensive campaigns for the use of toxoid.

New Haven has 36,000 school children, and during the past two school years has not had a single death from diphtheria. There have been only 25 cases reported during that time and, of these, 24 had never received the toxoid treatment.

"Health grading" will be one of the matters which Ontario's legislators will consider at the next session of the provincial parliament.

Extensive studies carried on by the Department of Health demonstrate the advisability of legislating to provide for physical examination of young men and women entering employment for the first time.

In brief, a final health examination at graduation will follow the present periodic examinations during the student's school years and a copy of this report will accompany each student to his job.

This, in the case of partial unfitness, is not intended as a bar to the young would-be worker but as a means of aiding him to select the proper occupation and to avoid positions which would be dangerous to him from the standpoint of health. It would bring about a scientific absorption of new workers into industrial activity.

Statistics show that the greatest amount of sickness among industrial workers occurs during the second year of employment. A system of health grading would be very effective in counteracting this.

A system, similar to the proposed one, is already operating among the public schools of Brantford, Ontario. Last year 3,067 children were examined and it is interesting to note that in 36 per cent. of the cases the parents accompanied the children, showing the very active interest which was taken in the movement locally. Numbers of incipient diseases were discovered and given treatment. Eleven T.B. suspects were sent to sanitaria and all are certain cures. They are thus not only saved from disease but have been removed as sources of infection at a later date. Others were given early treatment for minor tonsil, adenoid and eye troubles. About fifty cases of organic heart trouble were detected, and since they were found in the earlier stages, practically all can be cured.

Editorial

DIABETES AND STATISTICS

There are lies, d....d lies and statistics, said some sage philosopher. And statistics can both be juggled and misunderstood.

A case in point arose in Toronto recently when Toronto newspapers startled the public of that city by quoting from the statistical bulletin of the Metropolitan Life Insurance Company to the effect that insulin has failed to reduce the deathrate from diabetes. The inference which many of the reading public drew from the various reports of the discussion of the matter in the press was that insulin is not as valuable as we had been lead to suppose.

As a matter of fact a careful reading of the Metropolitan bulletin allows of no such inference. The bulletin states that of recent years the deathrate from diabetes has been gradually rising. The increase commenced long before the discovery of insulin and is attributed to the richer diets now in vogue. The statement is also made that since 1923 the deaths among white male diabetics have been on the average postponed two years, although the deathrate among colored diabetics among whom it may be assumed insulin is not so available has increased as has the deathrate among women. Among young diabetics in whom previously the disease ran a very rapid course the results from insulin treatment have been spectacular.

Summed up, the meaning of the Metropolitan statement may be said to be as follows. There has been an increase in the deathrate from diabetes for a number of years. Among those who take insulin the deathrate has fallen markedly. The inference is that were the use of insulin to be more widespread the general diabetic deathrate would be decreased. What the excuse is for a newspaper controversy based on such a statement it is rather difficult to ascertain.

MONTREAL'S TYPHOID EPIDEMIC

There were practically five thousand cases of typhoid fever in the City of Montreal between March 1st and August 1st of this year with many deaths.

Dr. Grant Fleming, Director of the Montreal Anti-Tuberculosis and General Health League, comments on the Report of the United States Public Health Service as follows:

"There are two things which impress me most. One is that they are satisfied the source of the epidemic was infected milk and the other the inadequacy of the local health department . . .

"In regard to the first, but little need be said. Different investigators may have different opinions as to how the typhoid germs got into the milk. All will agree, however, that if all the milk had been properly pasteurized, the typhoid fever germs would have been destroyed and there would not have been an epidemic.

"The question that Montreal citizens should ask themselves is—how can the recurrence of such an epidemic be prevented? There is but one answer, and that is—By the building up of an efficient health department. Such a department takes time to create. The city must be prepared to pay salaries that will permit the department to employ qualified workers and to keep them in the city service. The wonder is that, under present conditions, the health department is as efficient as it is.

"If epidemics are to be stopped, if disease and death are to be prevented, the necessary money must be properly spent. Efficient Health Departments are not built up over night. There is now the nucleus of such a department. In my opinion, the first thing to do is to raise the salaries of the good employees, so that they will remain in the service and feel that they are receiving reasonable remuneration. Next, additional trained workers must be secured, and if they are not to be found here, then they must be sought outside.

Montreal has had an unfortunate experience. Many cities have had a similar one, but not so severe. It seems to require such drastic lessons to stir communities to action. There is no doubt but that Montreal citizens want protection from such epidemics, there is no doubt but that such protection can be assured by building up a health department with an adequate budget, and by allowing the department freedom of action at all times.

"Unless this is done, it is just a matter of time, until Montreal is again a sore spot and again advertised as a place to avoid."

Dr. Fleming's comments are very much to the point and it is to be hoped that Montreal citizens will take heed. Montreal has lost money, but far more serious has been the loss of life—entirely avoidable and preventable. The lesson is that public education in health matters must be continued with renewed vigor to the end that everywhere the sacredness of human life may be realized and adequate means for its protection provided.